

Serial No.: 10/825,910  
Group Art Unit: 2818

#### AMENDMENTS TO THE DRAWINGS

Please amend FIGs. 6-8 which are on page 2 of the drawings as shown on the page which follows. The amended parts are discussed in the Remarks section and marked-up drawings showing the changes are included in an Appendix.

## REMARKS

### *Response to Arguments*

The Examiner stated that Applicants' arguments with respect to amended claims 1-20, filed May 28, 2005, have been considered, but are moot in view of new grounds of rejection. The Examiner stated:

“Applicant's amendment necessitated the new ground(s) of rejection presented in this Office Action. See MPEP § 706.07(a).”

### *Specification*

The specification has been amended to correct typographical errors and correctly recite the bonding connections shown in the original FIGs. 7 and 8. On page 7, line 21, reference numeral “604” has been deleted, and after “electrically conductive material”, --layer 608-- has been inserted. At page 7, line 24, “surface” has been deleted and --material layer 608-- has been inserted therefore. At page 8, line 17, before “heat sink” -- electrically conductive material layer 608 on-- has been inserted. At page 8, line 18, delete “heat sink 600” has been deleted, and -- electrically conductive material layer 608-- has been inserted. At page 8, line 20, “heat sink 600” has been deleted, and -- electrically conductive material layer 608-- has been inserted. Support for these amendments exists at page 7, lines 19-26, FIGs. 6-8, and originally filed claims 3, 4, 8, 9, 13, 14, 18, and 19.

### *Drawings*

The Examiner stated that the drawings are objected to under 37 CFR 1.83(a) because the-drawings must show every feature of the invention specified in the claims.

Applicants have amended FIGs. 6-8 to correct a numbering error with respect to the ground plane shown therein. The electrically conductive material layer was erroneously labeled “604” which is the identifying numeral for the undercut portion of the heat sink. Applicants have amended FIGs. 6-8 to change this reference numeral to 608 and made corresponding amendments to the specification. Similarly, the ground plane 610 has been

included in FIGs. 7 and 8. Support for these amendments exists at page 7, lines 19-26, FIGs. 6-8, and originally filed claims 3, 4, 8, 9, 13, 14, 18, and 19.

The Examiner also has alluded to the “legs integrally formed” with the undercut portion of the heat sink. Applicants would like to call the Examiner’s attention to FIGs. 9 and 10, which clearly show the legs 1002 integrally formed with the undercut portion of the heat sink.

Accordingly, Applicants respectfully submit that these objections have been overcome, and request reconsideration and withdrawal of these objections to the drawings.

### ***Claim Rejections - 35 USC §103***

**Claims 1, 2, 5-7, 10-12, 15-17, and 20 are rejected under 35 U.S.C. §103(a) as being unpatentable over Akram (U.S. Patent 6,351,028, hereinafter “Akram”, the ‘028 patent cited in a previous office action), in view of Ho et al. (U.S. Patent 6,507,104, hereinafter “Ho”, the ‘104 patent).**

With regard to claims 1, 6, 11, and 16, with respect to combining Akram and Ho, the Examiner has stated:

“Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the '028 patent' heat sink such that the heat sink has a plurality of legs integrally formed with the undercut portion of the heat sink. One would have been motivated to make such a change so that the plurality of legs provide support for the body portion which is positioned above the semiconductor die, as taught by the '104 patent. A semiconductor package such modified hereinafter is referred to as the '028/104 device, and the combined teachings is referred to as the '028/104 reference.”

Applicants respectfully traverse this rejection. Applicants agree with the Examiner that Akram:

“...fails to teach that the heat sink includes a plurality of legs integrally formed with the undercut portion of the heat sink, and thus further fails to teach attaching the plurality of legs to the substrate.”

Akram is directed to the packaging of more than one integrated circuit device within a common package. Akram discloses the use of a T-interposer between stacked dies in a package. There is no disclosure or suggestion in Akram that the T-interposer does or could

have legs. Therefore, Applicants submit that Akram actually teaches away from Applicants invention as claimed.

Ho is directed to a semiconductor package in which only one semiconductor chip [31] is packaged with a heat sink [33] attached to the semiconductor chip [31] using solder balls [35]. Ho refers to FIG. 2 in pointing out the drawbacks of the structure of FIG. 2 (see column 2, lines 1-16). Applicants respectfully submit that Ho actually teaches away from the use of a heat sink in a semiconductor package as claimed by Applicants by listing what are perceived to be these drawbacks.

Furthermore, Ho does not disclose or suggest the use of the heat sink shown in FIG. 2 in a semiconductor package having stacked dies. Ho discloses the device in FIG. 2 as prior art. The structure shown in FIG. 2 of Ho shows a heat sink that is exposed through the molding compound of the semiconductor package rendering it impossible to attach an additional semiconductor chip to the heat sink in FIG. 2 because the second semiconductor chip would be outside the semiconductor package rendering the resulting device inoperable. Applicants submit that a combination of references that results in an inoperable device is improper under 35 U.S.C. §103.

In fact, U.S. Patent No. 5,997,626 to Wu, et al (hereinafter Wu), which is referred to by Ho with reference to FIG. 2 at column 1, lines 52-67 states that:

“Preferably the heat spreader [32] is exposed by the molding compound [30].” (see column 3, lines 53-55 of Wu)

Wu, the patent referred to by Ho, therefore does not disclose or suggest a semiconductor package for stacked dies as claimed by Applicants. Ho does not disclose or suggest that more than one die may be stacked in a single package, and therefore teaches away from Applicants invention.

Since both Akram and Ho teach away from Applicants' invention, it is respectfully submitted that there is no teaching or suggestion to combine the references to arrive at Applicants' invention as required by 35 USC §103.

Where there is a specific hint or suggestion in a particular reference, but the references as a whole teach away from each other, the combination cannot be obvious according to the CAFC:

“We have noted elsewhere, as a “useful general rule,” that references that teach away cannot serve to create a prima facie case of obviousness... If references taken in combination would produce a “seemingly inoperative device”, we have held that such references teach away from the combination and thus cannot serve as predicates for a prima facie case of obviousness.” *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984) [deletion for clarity]

It is respectfully submitted that each reference has not been taken as whole but only portions of each reference have been combined and this is impermissible because the CAFC has stated:

“One cannot...pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.” *In re Fritch*, 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992).

Here the Examiner relied upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. The CAFC has previously stated that “[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.” *In re Fritch*, *supra*.

Accordingly, it is submitted that the Examiner’s reference to a “028/104 device, and the combined teachings of the ‘028/104 reference” is improper and without foundation because of *In re Gordon*, *supra* and *In re Fritch*, *supra*.

Applicants respectfully request reconsideration and withdrawal of this rejection since the Applicants’ claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Akram or Ho of a semiconductor package having stacked dies in which:

“the heat sink comprising a body portion, an undercut portion around a periphery thereof, and a plurality of legs integrally formed with the undercut portion”

Accordingly, Applicants submit that claims 1, 6, 11, and 16 are allowable over Akram and Ho taken either singly or in combination because of *In re Gordon*, *supra* and *In re Fritch*, *supra*.

With regard to claims 2, 7, 12, and 17, the Examiner has stated:

“Referring to claims 2, 7, 12, and 17, the '028/104 reference further discloses electrically connecting the first die (24) to the substrate uses a number of bonding wires (no number) and attaching a heat sink attaches a heat sink that extends laterally over the number of bonding wires, that extends laterally over the lower die, and such that the undercut of the heat sink extends laterally over the number of bonding wires.”

Applicants traverse this rejection. Referring to claims 2, 7, 12, and 17, these dependent claims respectively depend from independent claims 1, 6, 11, and 16 and are believed to be allowable for the reasons set forth above since they contain all the limitations set forth in the independent claims from which they depend and claim non-obvious combinations thereof.

With regard to claims 5 and 15, the Examiner has stated:

“Referring to claims 5 and 15, as evident from Figs. 5 and 9 of the '028 reference, the reference further discloses attaching a heat sink attaches a heat sink that extends laterally beyond the edges of the second die.”

Applicants respectfully traverse this rejection. Referring to claims 5 and 15, these dependent claims respectively depend from independent claims 1 and 11 and are believed to be allowable for the reasons set forth above since they contain all the limitations set forth in the independent claims from which they depend and claim non-obvious combinations thereof.

With regard to claims 10 and 20, the Examiner has stated:

“Referring to claims 10 and 20, as evident from Fig. 7, the reference further discloses providing a heat sink attaches a heat sink between each adjoining pair of dies in the stack of dies.”

Applicants respectfully traverse this rejection. Referring to claims 10 and 20, these dependent claims respectively depend from independent claims 6 and 16 and are believed to be allowable for the reasons set forth above since they contain all the limitations set forth in the independent claims from which they depend and claim non-obvious combinations thereof.

**Claims 3, 8, 13, and 18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Akram (U.S. Patent 6,351,028, hereinafter “Akram”, the ‘028 patent) in view of Ho et al. (U.S. Patent 6,507,104, hereinafter “Ho”, the ‘104 patent) as applied above, and further in view of Chiu et al. (U.S. Patent 6,437,984, hereinafter “Chiu”, the ‘984 patent cited in a previous office action).**

With regard to claims 3, 8, 13, and 18, the Examiner has stated:

“Chiu, in disclosing a thermally enhanced chip scale package having a heat sink (114, Fig. 1B), teaches that the heat sink may be wire bonded to a ground connection to provide the packaged integrated circuit with shielding from electrical or electromagnetic interference (column 2, lines 16-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the '028/104 reference's heat sink so that the heat sink is electrically grounded using wire bonding. One would have been motivated to make such a modification in view of the teachings by Chiu that ground connection using wire bonding provide the packaged integrated circuit with shielding from electrical or electromagnetic interference. A semiconductor package such modified hereinafter is referred to as the '028/104/984 device, and the combined teachings is referred to as the '028/104/984 reference.”

Applicants respectfully traverse this rejection. As set forth above with respect to claims 1, 6, 11, and 16 it is respectfully submitted that the Examiner's proposed combination of Akram and Ho is improper because of *In re Gordon, supra* and *In re Fritch, supra* since each reference teaches away from Applicants' invention, and if combined result in an inoperable device.

Furthermore, Chiu is directed to a semiconductor package that has only one semiconductor chip. Accordingly, Chiu does not disclose or suggest a semiconductor package with stacked dies as claimed by Applicants.

Since each of Akram, Ho, and Chiu teach away from Applicants' invention, it is respectfully submitted that there is no teaching or suggestion to combine the references to arrive at Applicants' invention as required by 35 USC §103. Accordingly, it is submitted that the Examiner's reference to a “'028/104 device, a '028/104/984 device” and the combined teachings of “the '028/104 reference or the '028/104/984 reference” is improper and without foundation because of *In re Gordon, supra* and *In re Fritch, supra*.

Applicants respectfully traverse this rejection since the Applicants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Akram, Ho, or Chiu of a semiconductor package having stacked dies in which:

“the heat sink comprising a body portion, an undercut portion around a periphery thereof, and a plurality of legs integrally formed with the undercut portion”

Accordingly, Applicants submit that claims 1, 6, 11, and 16 are allowable over Akram, Ho, and Chiu taken either singly or in combination.

Referring to claims 3, 8, 13, and 18, these dependent claims respectively depend from independent claims 1, 6, 11, and 16 and are believed to be allowable for the reasons set forth above since they contain all the limitations set forth in the independent claims from which they depend and claim non-obvious combinations thereof.

**Claims 4, 9, 14, and 19 are rejected under 35 U.S.C. §103(a) as being unpatentable over Akram (U.S. Patent 6,351,028, hereinafter “Akram”, the ‘028 patent) in view of Ho et al. (U.S. Patent 6,507,104, hereinafter “Ho”, the ‘104 patent), further in view of Chiu et al. (U.S. Patent 6,437,984, hereinafter “Chiu”, the ‘984 patent) as applied above (the ‘028/104/984 reference), and further in view of Shin et al. (U.S. Patent 5,854,511, hereinafter “Shin”, the ‘511 patent cited in a previous office action).**

With regard to claims 4, 9, 14, and 19, the Examiner has stated with respect to Shin:

“The '511 patent, in disclosing a semiconductor package including a multilayered heat sink, teaches in the Abstract, Figs. 1 and 2, and column 1, lines 10-22, that an electrically conductive coating formed of silver or nickel and palladium as part of the heat sink results in an improvement in performance of the finally produced semiconductor package.”

The Examiner concludes by stating:

“Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the heat sink of the '028/104/984 reference such that the heat sink has an electrically conductive coating. One would have been motivated to make such a modification in view of the teachings by the '511 patent...”

Applicants respectfully traverse this rejection. As set forth above with respect to claims 1, 6, 11, and 16 it is respectfully submitted that the Examiner's proposed combination



of Akram and Ho is improper because of *In re Gordon, supra* and *In re Fritch, supra* since each reference teaches away from Applicants' invention, and even if combined result in an inoperable device.

Furthermore, as set forth above with respect to claims 3, 8, 13, and 18 Chiu is directed to a semiconductor package that has only one semiconductor chip. Accordingly, Chiu does not disclose or suggest a semiconductor package with stacked dies as claimed by Applicants.

Additionally, Shin is directed to a semiconductor package that has only one semiconductor chip. The heat sink [20] appears to be exposed through the molding compound [50]. An attempt to attach a second semiconductor chip to the exposed surface of the heat sink [20] would result in an inoperable device because the second semiconductor chip would be outside the semiconductor package. Applicants submit that a combination of references that results in an inoperable device is improper under 35 U.S.C. §103 because of *In re Gordon, supra* and *In re Fritch, supra*.

Since each of Akram, Ho, Chiu, and Shin teach away from Applicants' invention, it is respectfully submitted that there is no teaching or suggestion to combine the references to arrive at Applicants' invention as required by 35 USC §103. Accordingly, it is submitted that the Examiner's reference to a "028/104 device, a '028/104/984 device" and the combined teachings of "the '028/104 reference or the '028/104/984 reference" is improper and without foundation because of *In re Gordon, supra* and *In re Fritch, supra*.

Applicants respectfully traverse this rejection since the Applicants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Akram, Ho, Chiu, or Shin of a semiconductor package having stacked dies in which:

"the heat sink comprising a body portion, an undercut portion around a periphery thereof, and a plurality of legs integrally formed with the undercut portion"

Accordingly, Applicants submit that claims 1, 6, 11, and 16 are allowable over Akram, Ho, Chiu, and Shin taken either singly or in combination.

Referring to claims 4, 9, 14, and 19, these dependent claims respectively depend from independent claims 1, 6, 11, and 16 and are believed to be allowable for the reasons set forth

above since they contain all the limitations set forth in the independent claims from which they depend and claim non-obvious combinations thereof.

**Claims 1, 2, 5-7, 10-12, 15-17 and 20 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ho et al. (U.S. Patent 6,507,104, hereinafter “Ho”, the ‘104 patent) in view of Akram (U.S. Patent 6,351,028, hereinafter “Akram”, the ‘028 patent cited in a previous office action).**

With regard to claims 1, 6, 11, and 16, the Examiner has stated:

“Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the ‘104 patent’ package such that the package comprises a second die so as to achieve increased density. A semiconductor package such modified hereinafter is referred to as the ‘104/028 device, and the combined teachings is referred to as the ‘104/028 reference, and a process for forming such a modified semiconductor package would comprise attaching the second die to the heat sink and electrically connecting the second die to the substrate.”

Applicants respectfully traverse this rejection.

Applicants agree with the Examiner that Ho:

“...fails to teach that the package comprises a second die, and thus fails to teach attaching a second die to the heat sink and electrically connecting the second die to the substrate.”

Ho is directed to a semiconductor package in which only one semiconductor chip [31] is packaged with a heat sink [33] attached to the semiconductor chip [31] using solder balls [35]. Ho refers to FIG. 2 in pointing out the drawbacks of the structure of FIG. 2 (see column 2, lines 1-16). Applicants respectfully submit that Ho actually teaches away from the use of a heat sink in a semiconductor package as claimed by Applicants by listing what are perceived in Ho to be these drawbacks.

Furthermore, Ho does not disclose or suggest the use of the heat sink shown in FIG. 2 in a semiconductor package having stacked dies. Ho discloses the device in FIG. 2 as prior art. The structure shown in FIG. 2 of Ho shows a heat sink that is exposed through the molding compound of the semiconductor package rendering it impossible to attach an additional semiconductor chip to the heat sink in FIG. 2 because the second semiconductor

chip would be outside the semiconductor package rendering the resulting device inoperable. Applicants submit that a combination of references that results in an inoperable device is improper under 35 U.S.C. §103 .because of *In re* Gordon, *supra* and *In re* Fritch, *supra*.

In fact, U.S. Patent No. 5,997,626 to Wu, et al (hereinafter Wu), which is referred to by Ho with reference to FIG. 2 at column 1, lines 52-67 states that:

“Preferably the heat spreader [32] is exposed by the molding compound [30].” (see column 3, lines 53-55 of Wu)

Wu, the patent referred to by Ho, therefore does not disclose or suggest a semiconductor package for stacked dies as claimed by Applicants.

Ho does not disclose or suggest that more than one die may be stacked in a single package, and therefore teaches away from Applicants invention.

Akram is directed to the packaging of more than one integrated circuit devices within a common package. Akram discloses the use of a T-interposer between stacked dies in a package. Applicants submit that Akram actually teaches away from Applicants invention as claimed.

Since both Ho and Akram teach away from Applicants’ invention, it is respectfully submitted that there is no teaching or suggestion to combine the references to arrive at Applicants’ invention as required by 35 USC §103. Accordingly, it is submitted that the Examiner’s reference to a “104/028 device, and the combined teachings of the ‘104/028 reference” is improper and without foundation because of *In re* Gordon, *supra* and *In re* Fritch, *supra*.

Applicants respectfully traverse this rejection since the Applicants’ claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Ho or Akram of a semiconductor package having stacked dies in which:

“the heat sink comprising a body portion, an undercut portion around a periphery thereof, and a plurality of legs integrally formed with the undercut portion”

Accordingly, Applicants submit that claims 1, 6, 11, and 16 are allowable over Ho and Akram taken either singly or in combination because of *In re* Gordon, *supra* and *In re* Fritch, *supra*.

With regard to claims 2, 7, 12, and 17, the Examiner has stated:

“Referring to claims 2, 7, 12, and 17, the '104/028 reference further discloses electrically connecting the first die (24) to the substrate uses a number of bonding wires (no number) and. attaching the modified heat sink attaches the modified heat sink that extends laterally over the number of bonding wires, that extends laterally over the lower die, and such that the undercut of the heat sink extends laterally over the number of bonding wires.”

Referring to claims 2, 7, 12, and 17, these dependent claims respectively depend from independent claims 1, 6, 11, and 16 and are believed to be allowable for the reasons set forth above since they contain all the limitations set forth in the independent claims from which they depend and claim non-obvious combinations thereof.

With regard to claims 5, and 15, the Examiner has stated:

“Referring to claims, 5 and 15, as evident from Figs. 5 and 9 of the '028 reference, the reference further discloses attaching a heat sink attaches a heat sink that extends laterally beyond the edges of the second die.”

Applicants respectfully traverse this rejection. Referring to claims 5 and 15, these dependent claims respectively depend from independent claims 1 and 11 and are believed to be allowable for the reasons set forth above since they contain all the limitations set forth in the independent claims from which they depend and claim non-obvious combinations thereof.

With regard to claims 10 and 20, the Examiner has stated:

“Referring to claims 10 and 20, as evident from Fig. 7 of the '028 reference, the reference further discloses providing a heat sink attaches a heat sink between each adjoining pair of dies in the stack of dies.”

Applicants respectfully traverse this rejection. Referring to claims 10 and 20, these dependent claims respectively depend from independent claims 6 and 16 and are believed to be allowable for the reasons set forth above since they contain all the limitations set forth in the independent claims from which they depend and claim non-obvious combinations thereof.

**Claims 3, 8, 13, and 18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ho et al. (U.S. Patent 6,507,104, hereinafter “Ho”, the ‘104 patent) in view of Akram (U.S. Patent 6,351,028, hereinafter “Akram”, the ‘028 patent) as applied above (the ‘104/028 reference), and further in view of Chiu et al. (U.S. Patent 6,437,984, hereinafter “Chiu”, the ‘984 patent).**

With regard to claims 3, 8, 13, and 18, the Examiner has stated:

“Chiu, in disclosing a thermally enhanced chip scale package having a heat sink (114, Fig. 1B), teaches that the heat sink may be wire bonded to a ground connection to provide the packaged integrated circuit with shielding from electrical or electromagnetic interference (column 2, lines 16-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the '104/028 reference's heat sink so that the heat sink is electrically grounded using wire bonding. One would have been motivated to make such a modification in view of the teachings by Chiu that ground connection using wire bonding provide the packaged integrated circuit with shielding from electrical or electromagnetic interference. A semiconductor package such modified hereinafter is referred to as the '104/028/984 device, and the combined teachings is referred to as the 104/028/984 reference.”

Applicants respectfully traverse this rejection. As set forth above with respect to claims 1, 6, 11, and 16 it is respectfully submitted that the Examiner's proposed combination of Ho and Akram is improper because of *In re Gordon, supra* and *In re Fritch, supra* since each references teaches away from Applicants' invention, and if combined result in an inoperable device.

Furthermore, Chiu is directed to a semiconductor package that has only one semiconductor chip. Accordingly, Chiu does not disclose or suggest a semiconductor package with stacked dies as claimed by Applicants.

Since each of Ho, Akram, and Chiu teach away from Applicants' invention, it is respectfully submitted that there is no teaching or suggestion to combine the references to arrive at Applicants' invention as required by 35 USC §103. Accordingly, it is submitted that the Examiner's reference to a “'104/028 device, a '104/028/984 device” and the combined teachings of “the '104/028 reference or the '104/028/984 reference” is improper and without foundation because of *In re Gordon, supra* and *In re Fritch, supra*.

Applicants respectfully traverse this rejection since the Applicants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Ho, Akram, or Chiu of a semiconductor package having stacked dies in which:

“the heat sink comprising a body portion, an undercut portion around a periphery thereof, and a plurality of legs integrally formed with the undercut portion”

Accordingly, Applicants submit that claims 1, 6, 11, and 16 are allowable over Ho, Akram, and Chiu taken either singly or in combination because of *In re* Gordon, *supra* and *In re* Fritch, *supra*.

Referring to claims 3, 8, 13, and 18, these dependent claims respectively depend from independent claims 1, 6, 11, and 16 and are believed to be allowable for the reasons set forth above since they contain all the limitations set forth in the independent claims from which they depend and claim non-obvious combinations thereof.

**Claims 4, 9, 14, and 19 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ho et al. (U.S. Patent 6,507,104, hereinafter “Ho”, the ‘104 patent) in view of Akram (U.S. Patent 6,351,028, hereinafter “Akram”, the ‘028 patent), further in view of Chiu et al. (U.S. Patent 6,437,984, hereinafter “Chiu”, the ‘984 patent) as applied above (the ‘104/028/984 reference), and further in view of Shin et al. (U.S. Patent 5,854,511, hereinafter “Shin”, the ‘511 patent).**

With regard to claims 4, 9, 14, and 19, the Examiner has stated with respect to Shin:

“The ‘511 patent, in disclosing a semiconductor package including a multilayered heat sink, teaches in the Abstract, Figs. 1 and 2, and column 1, lines 10-22, that an electrically conductive coating formed of silver or nickel and palladium as part of the heat sink results in an improvement in performance of the finally produced semiconductor package.”

The Examiner concludes by stating:

“Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the heat sink of the ‘104/028/984 reference such that the heat sink has an electrically conductive coating. One would have been motivated to make such a modification in view of the teachings by the ‘511 patent that an electrically conductive coating

formed of silver or nickel and palladium as part of the heat sink results in an improvement in performance of the finally produced semiconductor package.”

Applicants respectfully traverse this rejection. As set forth above with respect to claims 1, 6, 11, and 16 it is respectfully submitted that the Examiner’s proposed combination of Ho and Akram is improper because of *In re* Gordon, *supra* and *In re* Fritch, *supra* since each references teaches away from Applicants’ invention, and if combined result in an inoperable device.

Furthermore, as set forth above with respect to claims 3, 8, 13, and 18 Chiu is directed to a semiconductor package that has only one semiconductor chip. Accordingly, Chiu does not disclose or suggest a semiconductor package with stacked dies as claimed by Applicants.

Additionally, Shin is directed to a semiconductor package that has only one semiconductor chip. The heat sink [20] appears to be exposed through the molding compound [50]. An attempt to attach a second semiconductor chip to the exposed surface of the heat sink [20] would result in an inoperable device because the second semiconductor chip would be outside the semiconductor package. Applicants submit that a combination of references that results in an inoperable device is improper under 35 U.S.C. §103 because of *In re* Gordon, *supra* and *In re* Fritch, *supra*.

Since each of Ho, Akram, Chiu, and Shin teach away from Applicants’ invention, it is respectfully submitted that there is no teaching or suggestion to combine the references to arrive at Applicants’ invention as required by 35 USC §103. Accordingly, it is submitted that the Examiner’s reference to a “‘104/028 device, a ‘104/028/984 device” and the combined teachings of “the ‘104/028 reference or the ‘104/028/984 reference” is improper and without foundation because of *In re* Gordon, *supra* and *In re* Fritch, *supra*.

Applicants respectfully traverse this rejection since the Applicants’ claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Ho, Akram, Chiu, or Shin of a semiconductor package having stacked dies in which:

“the heat sink comprising a body portion, an undercut portion around a periphery thereof, and a plurality of legs integrally formed with the undercut portion”

Accordingly, Applicants submit that claims 1, 6, 11, and 16 are allowable over Akram, Ho, Chiu, and Shin taken either singly or in combination because of *In re Gordon*, *supra* and *In re Fritch*, *supra*.

Referring to claims 4, 9, 14, and 19, these dependent claims respectively depend from independent claims 1, 6, 11, and 16 and are believed to be allowable for the reasons set forth above since they contain all the limitations set forth in the independent claims from which they depend and claim non-obvious combinations thereof.

### *Conclusion*

In view of the above, it is submitted that the claims are in condition for allowance and reconsideration of the rejections is respectfully requested. Allowance of claims 1-20 at an early date is solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including any extension of time fees, to Deposit Account No. 50-0374 and please credit any excess fees to such deposit account.

Respectfully submitted,



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Date: August 17, 2005

Appendix follows with Annotated Marked-Up Drawings on next page





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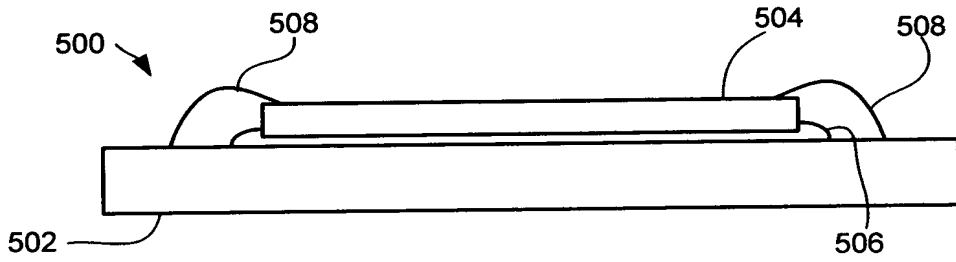


FIG. 5

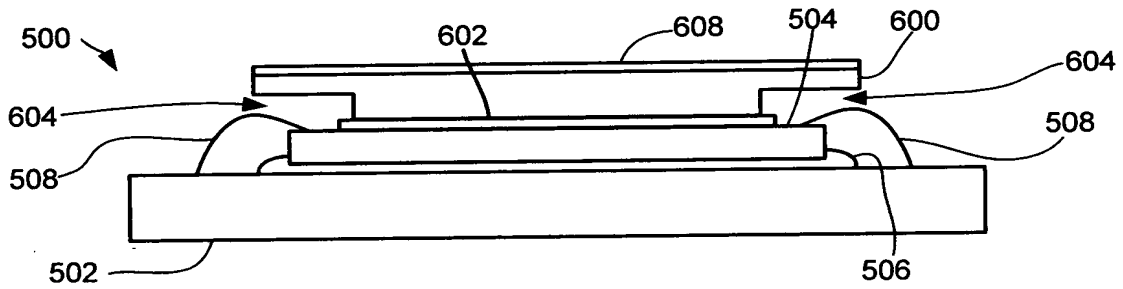


FIG. 6

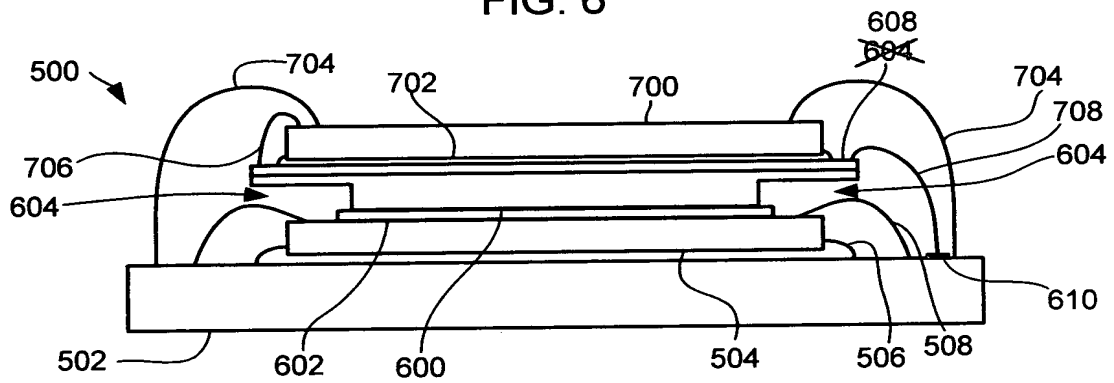


FIG. 7

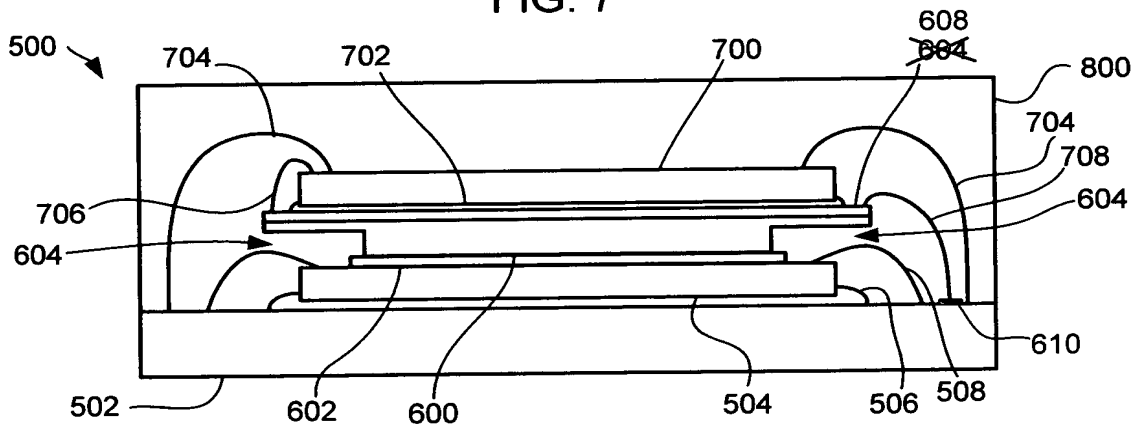


FIG. 8